I CLAIM:

Sub A7

1. A laser system, comprising:

a laser producing output light;

a non-planar etalon coupled to receive at least a portion of the output light, the non-planar etalon having at least one non-planar surface, the output light received by the non-planar etalon being formed into a fringe pattern; and

a detector unit including first and second detecting portions disposed to detect respective first and second portions of the fringe pattern.

2. A laser system as recited in claim 1, further comprising a collimator disposed on a light path between the laser and the non-planar etalon to reduce divergence of the output light and a beamsplitter disposed, between the collimator and the non-planar etalon, on the light path, wherein a minor portion of the output light propagating from the beamsplitter to the to the non-planar etalon, and a major portion of the output light propagating to an optical fiber as an output beam.

3. A laser system as recited in claim 1, further comprising a control unit coupled to provide drive current to the laser and one or more tuning currents to the laser, the control unit being coupled to receive detector signals from the detector unit, and controlling the one or more tuning currents in response to the received detector signals.

4. A laser system as recited in claim 1, wherein the detector unit is disposed to receive output light transmitted through the non-planar etalon.

5. A laser system as recited in claim 1, wherein the detector unit is disposed to receive output light reflected by the non-planar etalon.

6. A laser system as recited in claim 1, wherein the detector unit is disposed to receive light reflected by the non-planar etalon and light transmitted through the non-planar etalon.

7. A laser system as recited in claim 1, wherein fringes in the fringe pattern are spaced apart by a fringe spacing, the first and second detecting portions are spaced apart to detect portions of the fringe pattern spaced apart by a value different from an integral number of half fringe spacings.

8. A laser system as recited in claim 7, wherein the portions of the fringe pattern detected by the first and second detectors are spaced apart by approximately one quarter of the fringe spacing plus an integral number of half fringe spacings.

9. A laser system as recited in claim 1, wherein the non-planar etalon is formed between input and output surfaces of an internally reflecting prism.

10. A laser system as recited in claim 1, wherein the non-planar etalon includes a circularly symmetrical curved surface.

11. A laser system as recited in claim 1, wherein the non-planar etalon includes one of a cylindrical surface and a toroidal surface.

12. A laser system as recited in claim 11, further comprising a focusing lens disposed between the non-planar etalon and the detector unit.

13. A laser system as recited in claim 1, wherein the non-planar etalon is mounted in a mount providing at least two degrees of freedom relative to the at least a portion of the output light.

14. A laser system as recited in claim 1, further comprising a fiber communications channel having a first end coupled to receive a second portion of the output light and a wavelength division multiplexed receiver coupled at a second end of the fiber communications channel to detect the output light after propagating along the fiber communications channel.

15. A laser system as recited in claim 14, wherein the fiber communications channel includes one or more fiber amplifiers to amplify the output light propagating along the fiber communications channel.

16. A laser system as recited in claim 14, further comprising at least one other laser coupled to feed light into the fiber communications channel.

17. A laser system, comprising:

a laser producing output light;

a non-parallel etalon disposed to receive at least a portion of the output light, output light reflected by the non-parallel etalon being formed into a fringe pattern; and

a detector unit having first and second detectors disposed to detect respective first and second portions of the fringe pattern reflected from the non-parallel etalon.

18. A laser system as recited in claim 17, further comprising a collimator disposed on a light path between the laser and the non-parallel etalon to reduce divergence of the light output from the laser and a beamsplitter disposed, between the collimator and the non-parallel etalon, on the light path,

a minor portion of the output light propagating from the beamsplitter to the non-parallel etalon, and a major portion of the output light propagating from the beamsplitter to an output optical fiber.

19. A laser system as recited in claim 17, further comprising a control unit coupled to provide drive current to the laser and to provide one or more tuning currents to the laser, the control unit being coupled to receive detector signals from the detector unit, and controlling the one or more tuning currents in response to the received detector signals.

20. A laser system as recited in claim 19, wherein the detector unit further includes a power detector disposed to detect output light transmitted through the non-parallel etalon, the control unit being coupled to receive a power signal from the power detector, and the control unit controlling the drive current to the laser in response to the received power signal.

21. A laser system as recited in claim 17, wherein fringes in the fringe pattern are spaced apart by a fringe spacing, the first and second detectors are spaced apart to detect portions of the fringe pattern spaced apart by a value different from an integral number of half fringe spacings.

22. A laser system as recited in claim 21, wherein the portions of the fringe pattern detected by the first and second detectors are spaced apart by approximately one quarter of the fringe spacing, plus an integral number of half fringe spacings.

23. A laser system as recited in claim 17, wherein the non-parallel etalon is formed between input and output surfaces of an internally reflecting prism.

24. A laser system as recited in claim 17, wherein the non-parallel etalon is wedged.

25. A laser system as recited in claim 17, wherein the non-parallel etalon includes a circularly symmetrical curved surface.

26. A laser system as recited in claim 17, wherein the non-parallel etalon includes one of a cylindrical surface and a toroidal surface.

27. A laser system as recited in claim 26, further comprising a cylindrical focusing lens between the non-parallel etalon and the detector unit.

28. A laser system as recited in claim 17, wherein the non-parallel etalon is mounted in a mount providing at least two degrees of freedom relative to the at least a portion of the output light.

29. A laser system as recited in claim 17, further comprising a housing containing the laser, the non-parallel etalon and the detector unit.

30. A laser system as recited in claim 17, further comprising a fiber communications channel having a first end coupled to receive a second portion of the output light, and a wavelength division multiplexed receiver coupled at a second end of the fiber communications channel to detect the light output by the laser.

31. A laser system as recited in claim 30, wherein the fiber communications channel includes one or more fiber amplifiers to amplify the light output by the laser.

32. A laser system as recited in claim 30, further comprising at least one other laser coupled to feed light into the fiber communications channel.

33. A laser system, comprising:

a laser producing a light output;

an etalon mounted to provide at least translational and tilt adjustments of the etalon relative to the light output, the etalon producing a fringe pattern from the light output; and

a detector unit disposed to detect at least first and second portions of the fringe pattern.

34. A laser system as recited in claim 33, wherein the etalon has at least one non-planar surface.

35. A laser system as recited in claim 33, wherein a thickness of the etalon varies across the width of the etalon.

36. A laser system as recited in claim 33, the etalon is formed between input and output surfaces of an internally reflecting prism.

37. A laser system as recited in claim 35, wherein the laser is operated at one of a set of discrete optical channel frequencies having uniform interchannel frequency spacing, the free spectral range of the etalon being matched to the interchannel frequency spacing, and one of a transmission and reflection maximum of the etalon being matched to one of the discrete optical channel frequencies, by translational and tilt adjustment of the etalon.

38. A laser system as recited in claim 33, further comprising a control unit coupled to control one or more tuning currents applied to the laser and to receive detector signals from the detector unit, the control unit adjusting the one or more tuning currents in response to the detector signals received from the detector unit.

39. A laser system as recited in claim 38, wherein the control unit includes a memory unit, the memory unit includes information relating specific tuning current levels to corresponding laser operating wavelengths, and the control unit selects a set of one or more tuning currents to operate the laser at a selected operating wavelength and adjusts the one or more tuning currents in response to the detector signals to align the actual laser operating wavelength with the selected operating wavelength.

40. A laser system as recited in claim 39, wherein the detector signals include first and second detection signals corresponding to amounts of light detected respectively in the first and second portions of the fringe pattern.

41. A laser system as recited in claim 40, wherein the first and second portions of the fringe pattern are separated by a distance approximately equal to an integral number of half fringe spacings of the fringe pattern.

42. A laser system as recited in claim 40, wherein the first and second portions of the fringe pattern are separated by a distance different from an integral number of half fringe spacings of the fringe pattern.

43. A laser system as recited in claim 42, wherein the first and second portions of the fringe pattern are separated by a distance corresponding to a quarter of a fringe spacing plus an integral number of half fringe spacings.

44. A laser system as recited in claim 33, further comprising a fiber communications channel having a first end coupled to receive light output from the laser and a wavelength division multiplexed receiver coupled at a second end of the fiber communications channel to detect the light output by the laser.

45. A laser system as recited in claim 44, wherein the fiber communications channel includes one or more fiber amplifiers to amplify the light output by the laser.

46. A laser system as recited in claim 44, further comprising at least one other laser coupled to feed light into the fiber communications channel.

47. A laser system, comprising:

a tunable laser diode producing a light output incident on a wavelength selective filter having a periodic frequency response;

a detector unit to detect at least a portion of light output from the wavelength selective filter; and

a control unit coupled to receive detector signals from the detector unit and to apply one or more tuning signals to the tunable laser diode, the control unit including a memory unit storing information relating magnitudes of the one or more tuning signals to a set of laser operating wavelengths, the control unit selecting a set of one or more tuning signals corresponding to a selected operating wavelength, and adjusting the one or more tuning signals in response to the detector signals so as to match an actual laser operating wavelength to the selected operating wavelength.

48. A laser system as recited in claim 47, wherein the wavelength selective filter is a non-parallel etalon.

49. A laser system as recited in claim 48, wherein the non-parallel etalon is mounted on a mount providing translational and tilt adjustment relative to light incident on the non-planar etalon from the tunable laser diode.

50. A laser system as recited in claim 47, wherein the periodicity of the wavelength selective filter output is less than a desired tuning range of the laser diode.

51. A laser system as recited in claim 47, wherein the control unit further includes a current supply coupled to provide a drive current to the tunable laser diode and to apply one or more tuning currents to respective one or more tuning sections of the laser diode as the one or more tuning signals.

52. A laser system as recited in claim 47, wherein the control unit further includes a processor to process the detector signals received from the detector unit and to compare measured detector signal values with stored detector signal values.

53. A laser system as recited in claim 52, wherein the control unit adjusts the one or more tuning signals in order to match the measured detector signal values with the stored detector signal values.

54. A laser system as recited in claim 47, wherein the tunable laser diode is one of a grating coupled, sampled distributed Bragg reflector laser and a vernier, dual distributed Bragg reflector laser.

55. A laser system as recited in claim 47, further comprising a fiber communications channel having a first end coupled to receive light output from the laser and a wavelength division multiplexed receiver coupled at a second end of the fiber communications channel to detect the light output by the laser.

56. A laser system as recited in claim 55, wherein the fiber communications channel includes one or more fiber amplifiers to amplify the light output by the laser.

57. A laser system as recited in claim 55, further comprising at least one other laser coupled to feed light into the fiber communications channel.

58. A method of stabilizing output wavelength of a laser, comprising:

forming an etalon fringe pattern using light generated by the laser incident on a non-planar etalon;

detecting amounts of light in first and second portions of the etalon fringe pattern; and

adjusting an operating wavelength in response to the detected amounts of light in the first and second portions of the etalon fringe pattern.

59. A method as recited in claim 58, wherein detecting the amounts of light in the first and second portions of the etalon fringe pattern includes detecting light reflected by the non-planar etalon.

60. A method as recited in claim 59, further comprising detecting power of light transmitted through the non-planar etalon.

61. A method as recited in claim 58, wherein detecting the amounts of light in the first and second portions of the etalon fringe pattern includes detecting light transmitted through the non-planar etalon.

62. A method as recited in claim 58, wherein the first portion of the etalon fringe pattern is spaced apart from the second portion of the etalon fringe pattern by an amount different from an integral number of half fringe spacings.

63. A method as recited in claim 62, wherein the first portion of the etalon fringe pattern is spaced apart from the second portion of the etalon

fringe pattern by an amount approximately equal to an integral number of half fringe spacings plus a quarter fringe spacing.

64. A method as recited in claim 58, wherein forming the etalon fringe pattern includes directing the light from the laser to a non-planar etalon having a circularly symmetric curved surface.

65. A method as recited in claim 58, wherein forming the etalon fringe pattern includes directing the light from the laser to a non-planar etalon having one of a cylindrical surface and a toroidal surface.

66. A method as recited in claim 65, further comprising focusing the laser light between the non-planar etalon and the detector unit.

67. A method as recited in claim 58, further comprising adjusting position of the non-planar etalon in a direction perpendicular to a direction of the light incident on the non-planar etalon and in a tilt direction relative to the light incident on the non-planar etalon.

68. A wavelength stabilized laser, comprising:

non-planar means for forming an etalon fringe pattern using light generated by the laser;

means for detecting amounts of light in first and second portions of the etalon fringe pattern; and

means for adjusting an operating wavelength of the laser in response to the detected amounts of light in the first and second portions of the etalon fringe pattern.

69. A method of locking an operating wavelength of a laser, comprising:

directing light from a laser to an etalon;

adjusting a position of the etalon in a direction perpendicular to a direction of the light incident on the etalon;

adjusting a tilt orientation of the etalon relative to the direction of the light incident on the etalon; and

detecting at least two portions of a fringe pattern generated by the light incident on the etalon to form respective detector signals.

70. A method as recited in claim 69, wherein directing the light includes directing the light to a non-parallel etalon.

71. A method as recited in claim 69, wherein directing the light includes directing the light to an etalon having a thickness that varies across the width of the etalon.

72. A method as recited in claim 69, further comprising operating the laser at one of a set of discrete optical communications channel frequencies having uniform interchannel frequency spacing, matching a free spectral range of the etalon to the interchannel frequency spacing, and matching one of a transmission and reflection maximum of the etalon to the one of the set of discrete optical communications channel frequencies.

73. A method as recited in claim 69, further comprising adjusting one or more tuning currents applied to the laser in response to the detector signals.

74. A method as recited in claim 73, further comprising selecting a set of one or more tuning currents corresponding to a desired laser operation wavelength, and adjusting the one or more tuning currents in response to the detector signals to align the actual laser operating wavelength with the desired operating wavelength.

75. A wavelength locked laser, comprising:

means for directing light from a laser to an etalon;

means for adjusting position of the etalon in a direction perpendicular to a direction of the light incident on the etalon;

means for adjusting a tilt orientation of the etalon relative to the direction of the light incident on the etalon; and

means for detecting at least two portions of a fringe pattern generated by the light incident on the etalon to form respective detector signals.

76. A method of stabilizing an operating wavelength of a tunable laser diode, comprising:

selecting, from a memory, a set of one or more tuning signals corresponding to a selected operating wavelength;

applying the set of one or more tuning signals to the tunable laser diode;

directing light from the tunable laser diode to a wavelength selective filter having a periodic frequency response;

detecting portions of light propagating from the wavelength selective filter to form detector signals; and

adjusting the one or more tuning signals in response to the detector signals.

77. A method as recited in claim 76, wherein directing the light includes directing the light to a non-planar etalon.

78. A method as recited in claim 77, further comprising adjusting a position of the non-planar etalon in a direction perpendicular to a propagation direction of the light directed to the filter, and adjusting a tilt orientation of the

non-planar etalon relative to the propagation direction of the light directed to the filter.

79. A method as recited in claim 76, wherein the periodic frequency response of the wavelength selective filter has a periodicity less than a desired tuning range of the laser diode.

80. A method as recited in claim 76, wherein the selected operating wavelength is one of a set of operating wavelengths corresponding to wavelengths of optical channels in an optical communications system.

81. A method as recited in claim 76, further comprising supplying a drive current to the tunable laser diode.

82. A method as recited in claim 76, wherein applying the set of one or more tuning signals includes applying one or more tuning currents to respective one or more integrated tuning sections of the tunable laser diode.

83. A method as recited in claim 76, wherein applying the set of one or more tuning signals includes adjusting a temperature of the tunable laser diode.

84. A method as recited in claim 76, further comprising processing the detector signals, comparing the processed detector signals with stored detector signal values, and adjusting the one or more tuning signals to match the detector signals with the stored detector signal values.

85. A tunable laser diode system, comprising:

means for selecting a set of one or more tuning signals corresponding to a selected operating wavelength from a memory;

means for applying the set of one or more tuning signals to the tunable laser diode;

means for directing light from the laser to a wavelength selective filter having a periodic frequency response;

means for detecting portions of light propagating from the wavelength selective filter to form detector signals; and

means for adjusting the one or more tuning signals in response to the detector signals.

86. A method of stabilizing an output wavelength of a laser, comprising:

forming an etalon fringe pattern using light generated by the laser incident on a non-parallel etalon;

detecting amounts of light in first and second portions of the etalon fringe pattern formed by light reflected from the non-planar etalon; and

adjusting an operating wavelength in response to the detected amounts of light in the first and second portions of the etalon fringe pattern.

87. A method as recited in claim 86, further comprising detecting the light transmitted through non-parallel etalon to generate a detected power value.

88. A method as recited in claim 86, wherein the first portion of the etalon fringe pattern is spaced apart from the second portion of the etalon fringe pattern by an amount different from an integral number of half fringe spacings.

89. A method as recited in claim 88, wherein the first portion of the etalon fringe pattern is spaced apart from the second portion of the etalon fringe pattern by an amount approximately equal to an integral number of half fringe spacings plus a quarter fringe spacing.

90. A method as recited in claim 86, wherein forming the etalon fringe pattern includes directing the light from the laser to a wedged etalon.

91. A method as recited in claim 86, wherein forming the etalon fringe pattern includes directing the light from the laser to a non-planar etalon.

92. A method as recited in claim 91, further comprising focusing the laser light between the non-planar etalon and the detector unit.

93. A method as recited in claim 86, further comprising adjusting a position of the non-planar etalon in a direction perpendicular to a direction of the light incident on the non-planar etalon and in a tilt direction relative to the light incident on the non-planar etalon to match a free spectral range of the non-planar etalon with a desired frequency spacing and to match a reflection wavelength maximum to a desired wavelength.

94. A laser, comprising:

non-parallel etalon means for forming an etalon fringe pattern using light generated by the laser;

means for detecting amounts of light in first and second portions of the etalon fringe pattern formed by light reflected from the non-planar etalon means; and

means for adjusting an operating wavelength in response to the detected amounts of light in the first and second portions of the etalon fringe pattern.